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10/733,201	12/09/2003	Garo J. Derderian	MI22-2402	5994
21567	7590	01/18/2008		
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			EXAMINER STOUFFER, KELLY M	
			ART UNIT	PAPER NUMBER
			1792	
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			01/18/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/733,201

Applicant(s)

DERDERIAN ET AL.

Examiner

Kelly Stouffer

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-79, 83, 85, 87, 89 and 90 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-12, 35, 37, 38 and 52-55 is/are allowed.
- 6) ☒ Claim(s) 1-8, 13-34, 36, 39-51, 56-79, 83, 85, 87, 89 and 90 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 26 December 2007 has been entered.

Response to Arguments

Applicant's arguments filed 26 December 2007 have been fully considered but they are not persuasive. With regard to the 35 USC 112 1st paragraph rejection of claims 83-88, the applicant argues that the porous oxide with substantially closed-cell pores was reduced to practice in the specification, and that the process parameters cited by the examiner in support for the rejection are not critical to the substantially closed-cell pores and one of ordinary skill in the art would recognize it as such. However, the applicant only mentions the attainment of substantially closed cell pores in a specific example in the instant specification in paragraph 0043. Though the applicant clearly would have possession of the species of substantially closed cell pores in an aluminum oxide layer with the process parameters used in the instant claims, the applicant certainly does not indicate that they possess all oxides with all process

conditions with substantially closed cell pores as the claim broadly asserts, absent evidence provided from the applicant showing otherwise. Further, it is noted by the examiner that the process conditions are critical in paragraph 0043 of the instant specification, as the specification states "the degree of porosity if expected to be modifiable by manipulating various [variables] of the above-stated exemplary parameters." This clearly indicates that not all process conditions as claimed would achieve an oxide with substantially closed pores.

The applicant argues that the oxide in Werkhoven et al. is not inherently porous. However, as it is claimed broadly in claims 1, 44, and 68, the processes of these claims make a porous oxide. As Werkhoven et al. (or Werkhoven et al. in combination with other references as discussed below) teaches these processes as they are claimed, it also makes a porous oxide at least as broadly claimed. Though it is not explicitly stated in the Werkhoven reference, one of ordinary skill in the art would recognize that if the applicant, in claim 1, says that their process steps are effective to form porous oxide, it follows that if one follows these process steps one should achieve porous oxide. Further, as evidence, in the applicants' own specification, the applicant makes the admission that the porosity of the oxide to use of remote nitrogen plasma in paragraph 0030 of the instant specification. This section of the instant specification suggests that this is an inherent property, as long as remote plasma nitrogen is used on the film. Paragraph 0043, in addition, attributes the porosity of the film to treatment by remote plasma nitrogen that removes nitrogen being formed in the oxide layer and generates pores in the process. Therefore, since Werkhoven uses this plasma nitrogen treatment

as well, it is inherent that the oxide produced by their procedure is porous on a substrate. To suggest otherwise is indicating that the invention as claimed in claim 1 may not be operable or enabling for one of ordinary skill in the art to reproduce the invention if the applicant is suggesting that something other than remote plasma nitrogen or some other critical element, not described in the specification, is causing the porosity of the oxide. Therefore, for at least these reasons, the rejections of the previous office action are maintained and repeated here. New grounds of rejection are present below for claims 89 and 90.

Specification

The disclosure is objected to because of the following informalities: In paragraph 0043 line 19 "various" should be –variables—(or the like).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 83, 85, 87 and 89-90 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains

subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The applicant claims a porous oxide to have substantially closed cell pores and the coating effective to form a porous oxide of about 50% porosity. Upon review of the specification, no indication of ownership was found of a porous oxide with substantially closed pores. In paragraph 0043 an aluminum oxide formed under specific process conditions with approximately 50% porosity is mentioned. This does not indicate that the applicant had possession of a 50 % oxide for all of the oxides and process conditions as broadly claimed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 14-17, 27-34, 36, and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by US Publication number 2001/0041250 A1 to Werkhoven et al. Claim 1 of the applicant requires a porous oxide deposited by atomic layer deposition (ALD) on a substrate in a chamber with repeated steps of a first adsorbed monolayer and second step of contact with oxygen and nitrogen remote plasma. Werkhoven et al. discloses a process for forming a porous oxide (Werkhoven uses the same procedure in

claim 1 as the applicant in making the oxide. In the applicants' own specification, the applicant attributes porosity of the oxide to use of remote nitrogen plasma in paragraph 0030 of the instant specification. This section of the instant specification suggests that this is an inherent property, as long as remote plasma nitrogen is used on the film. Therefore, since Werkhoven uses this as well, it is inherent that the oxide produced by their procedure is porous on a substrate in a chamber by ALD (paragraphs 0034 and 0042 lines 3-6 and 1-3 respectively) consisting of the steps of depositing a monolayer of the oxide in paragraph 0055 lines 1-5 and then contacting it with oxygen and nitrogen remote plasma (paragraph 0060 lines 1-5) where the oxygen plasma source contains ozone (paragraphs 0046 lines 6-7 and paragraph 0048 et seq.) Werkhoven et al. meets all the recitations of claim 1, at least as broadly recited by claim 1.

In claims 2 and 3 the applicant requires an electrically insulative oxide, and an oxide comprising SiO_2 . Werkhoven et al. discloses the film as SiO_2 in paragraph 0085 lines 1-2, which by nature may be electrically insulative. Werkhoven et al. meets all the recitations of claims 2 and 3, at least as broadly recited by claims 2 and 3.

In claims 4 and 14 the applicant requires an oxide comprising Al_2O_3 with a trimethyl aluminum precursor and aluminum component in the film. Werkhoven et al. discloses the film as Al_2O_3 with a trimethyl aluminum precursor and aluminum component in the film in paragraphs 0088 and 0089 et seq. Werkhoven et al. meets all the recitations of claims 4 and 14, at least as broadly recited by claims 4 and 14.

With regard to claims 15 and 17, the gaseous precursor for silicon dioxide includes a silane in paragraph 0046 lines 1-6. . Werkhoven et al. meets all the recitations of claims 15 and 17, at least as broadly recited by claims 15 and 17.

With regard to claim 16, Werkhoven et al. discloses a silicon source gas that can be any gas containing silicon in paragraph 0046 lines 1-6. This includes TEOS as required by the applicant. Werkhoven et al. meets all the recitations of claim 16, at least as broadly recited by claim 16.

With regard to claims 27-29, Werkhoven et al. discloses the oxygen source gas as O₂ or O₃ in paragraph 0046 lines 6-7 and paragraph 0048 et seq. Werkhoven et al. meets all the recitations of claims 27-29, at least as broadly recited by claims 27-29.

With regard to claims 30-34, 36, and 39, Werkhoven et al. discloses the nitrogen source and oxygen source processed into a plasma by a plasma generator 60 in Figure 1 as described in paragraph 0060 lines 1-5. The nitrogen source can be separate from the oxygen source and fed into the chamber at different times spaced from one another or included in the oxygen source as a mixture from the same plasma generator 60. The two sources can also be entered into the chamber at times that overlap one another as disclosed in paragraph 0072 lines 1-4. Werkhoven et al. meets all the recitations of claims 30-34, 36, and 39, at least as broadly recited by claims 30-34, 36, and 30.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 40-48, 57-58, and 65-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Werkhoven et al. Werkhoven et al. is described in section 3 above and includes all recitation of claims 40-48, 57-58, and 65-73 at least as broadly recited by the applicant with the exception of including specific percentage by volume concentrations of nitrogen in the remote plasma. Werkhoven et al. teaches that the reaction between the silicon layer and the nitrogen source (in this case ammonia) has a different thermodynamic capability than the reaction between the silicon layer and the oxygen source (paragraph 0070 et seq.). The appropriate concentration of nitrogen is said by Werkhoven et al. to be by routine experimentation to account for the thermodynamic competition between the nitrogen and oxygen reactions in paragraph

0070 et seq. The variable of nitrogen concentration in the plasma depends upon the reaction conditions, and its importance is in accounting for the thermodynamic competition therefore it is a result-effective variable and its modification is not inventive.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Werkhoven et al. by routine experimentation to include nitrogen concentrations in the nitrogen and oxygen remote plasma in the ranges of 0.01-90%, 0.1-10%, 0.1-3%, 0.01-1% by volume in order to account for the thermodynamic competition between the oxygen and nitrogen reactions with the surface layer absent evidence showing a criticality for the abovementioned ranges. (See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955))

Claims 5-8, 13, 18-20, 48-51 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Werkhoven et al. in view of US Patent number 4652463 to Peters. Werkhoven et al. is described above and includes a method for making an insulative oxide film (aluminum oxide) with a vapor precursor of trimethyl aluminum. Werkhoven et al. in paragraph 0017 et seq. also describes the desirability of a layer comprising a conductive material to reduce electromigration. Werkhoven et al. does not include using a conductive layer such as indium oxide, tin oxide, or indium-tin oxide (a film that contains multiple cations) with precursors of trimethyl tin or trimethyl indium. Peters teaches a method for making a conductive oxide film that consists of indium oxide, tin oxide, or indium-tin oxide with precursors of trimethyl tin or trimethyl indium (column 7 lines 40-46) because indium oxide, tin oxide, and indium-tin oxide have

properties of high transparency, mechanical hardness, and environmental stability (column 1 lines 40-44).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Werkhoven et al. to include film of indium oxide, tin oxide, or indium-tin oxide with precursors of trimethyl tin or trimethyl indium as taught by Peters in order to produce a film that has properties of high transparency, mechanical hardness, and environmental stability.

Claims 21-26, 59-64, and 74-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Werkhoven et al. in view of US Patent number 6960537 to Shero et al. Werkhoven et al. is described above and includes an ALD method for producing an oxide film that includes the use of nitrogen remote plasma. Werkhoven et al. does not include the nitrogen source of the remote plasma to be N_2 , N_2O , or NO. Shero et al. teaches the source gas of the nitrogen remote plasma to be N_2 , N_2O , or NO in order to provide a plurality of nitrogen sources to the inlet 54 in Figure 1 as disclosed in column 8 lines 5-20.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Werkhoven et al. to include the nitrogen source of the remote plasma to be N_2 , N_2O , or NO as taught by Shero et al. in order to provide a plurality of nitrogen sources to the plasma generator and reaction chamber.

Allowable Subject Matter

Claims 9-12, 35, 37-38 and 52-55 are allowed for reasons discussed in the previous office actions, as they contain allowable limitations re-written in independent form.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly Stouffer whose telephone number is (571) 272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

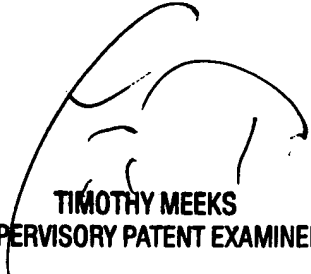
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Examiner

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